4.6 COMMON ERRORS WITH EXPONENTS: Find the mistakes.

The exponent laws are often used incorrectly. Here are some examples.

Example 1: (product rule)

Mistake: $x^3 \cdot x^2 = x^6$ **Correction:** $x^3 \cdot x^2 =$ _____

(Multiply two (or more factors that have the same base by **adding** (not multiplying) the exponents. This rule applies to all powers, including negative and fractional powers.)

($x^{\frac{7}{6}}$)

Now try this one: $x^{\frac{1}{2}} \cdot x^{\frac{2}{3}} =$ _____

Example 2: (product rule)

Mistake: $\frac{x^8}{x^4} = x^2$ **Correction:** $\frac{x^8}{x^4} =$ _____

(Divide factors that are the same base by **subtracting** (not dividing) the exponents. This rule applies to all powers, including negative and fractional powers.)

(x)

Now try this one: $\frac{x^{\frac{3}{2}}}{x^{\frac{1}{2}}}$ = _____

Example 3: (power rule)

Mistake: $(x^2)^3 = x^{2^3} = x^8$ **Correction:** $(x^2)^3 =$ _____

(Raise an exponent expression or power to another exponent by **multiplying** the exponents. This rule applies to all powers, including negative and fractional powers.)

($x^{\frac{5}{2}}$)

Now try this one: $\left(x^{\frac{5}{6}}\right)^3$ = _____

Example 4: (negative exponent)

Mistake: x^{-2} **means** $\sqrt{x}$ **Correction:** x^{-2} **means :** _____

A negative exponent indicates the inverse or reciprocal of the base, raised to a positive exponent. The reciprocal meaning applies to all negative exponents, including fractional exponents.)

($\frac{1}{9}$)

Now try this one: 3^{-2} = _____

Example 5: (fractional exponent)

Mistake: $x^{\frac{1}{2}}$ means $\frac{1}{x^2}$ Correction: $x^{\frac{1}{2}}$ means _____

(A fractional exponent indicates a **radical**. To write a power with fractional exponent as a radical, the denominator is the index of the radical and the numerator is the power. To write a radical as a fractional exponent, the power to which the base is raised becomes the numerator and the root becomes the denominator.)

($\left(\sqrt{4}\right)^3 = 8$)

Now try this one: Write as a radical: $4^{\frac{3}{2}}$ = _____

Example 6: Precedence of Exponents:

Mistake: $3x^{-1} = \frac{1}{3x}$ Correction: $3x^{-1} =$ _____

Remember BEDMAS: exponent before multiplication. The exponent -1 ONLY APPLIES TO x, not to 3x. If you wanted 3x to be raised to -1, you need to put 3x in brackets: $(3x)^{-1}$

($\frac{-1}{x^2}$)

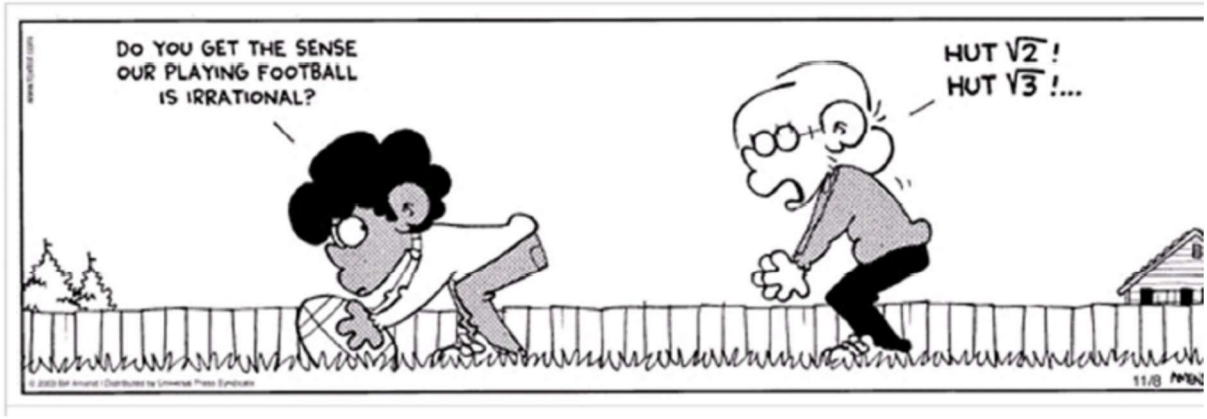
Now try this one: $-x^{-2}$ = _____

Put it all together! Simplify: a) $\frac{10b^2c^2}{c\sqrt[3]{8b^4}}$ b) $\frac{4a^2}{2\sqrt{a}}$

Identify the errors in each solution.

a) $$\frac{12x^{-5}y^{\frac{5}{2}}}{3x^{\frac{1}{2}}y^{-\frac{1}{2}}} = 4x^{-5-\frac{I}{2}}y^{\frac{5}{2}-\frac{1}{2}} = 4x^{-\frac{6}{2}}y^{\frac{4}{2}} = 4x^{-3}y^{2} = \frac{4y^2}{x^3}$$

b) $$\left(\frac{50x^2y^4}{2x^4y^7}\right)^{\frac{1}{2}} = \left(48x^{-\frac{1}{2}}y^{-3}\right)^{\frac{1}{2}} = 48^{\frac{1}{2}}x^{-1}y^{\frac{-3}{2}} = \frac{\sqrt{48}}{xy^{\frac{3}{2}}}$$



Ex. Simplify completely. Write final answer with positive exponents.

a. $\left(\frac{2x^3y^2}{4x^2y^6}\right)^{-3}$

BEDMAS: First simplify the exponents in the expression in the BRACKET. Then use the EXPONENT law to simplify the expression. Then use the negative exponent law to create positive exponents.

b. $(3a^3b^{-2})(15a^2b^5)$

c. $\left(\frac{40x^4y^7}{4xy^2}\right)^{-2}$

d. $(-2m^2n)(4mn^{-1})$

e. $-8x^{-2}y^4z^{-7}$